

2N1613

SILICON

NPN TRANSISTOR



TO-39 CASE



www.centrasemi.com

DESCRIPTION:

The CENTRAL SEMICONDUCTOR 2N1613 is a silicon NPN epitaxial planar transistor designed for small signal general purpose switching applications.

MARKING: FULL PART NUMBER

MAXIMUM RATINGS: ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

	SYMBOL		UNITS
Collector-Base Voltage	V_{CBO}	75	V
Collector-Emitter Voltage	V_{CER}	50	V
Emitter-Base Voltage	V_{EBO}	7.0	V
Continuous Collector Current	I_C	500	mA
Power Dissipation ($T_C=25^{\circ}\text{C}$)	P_D	3.0	W
Power Dissipation	P_D	0.8	W
Operating and Storage Junction Temperature	T_J, T_{stg}	-65 to +200	$^{\circ}\text{C}$

ELECTRICAL CHARACTERISTICS: ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

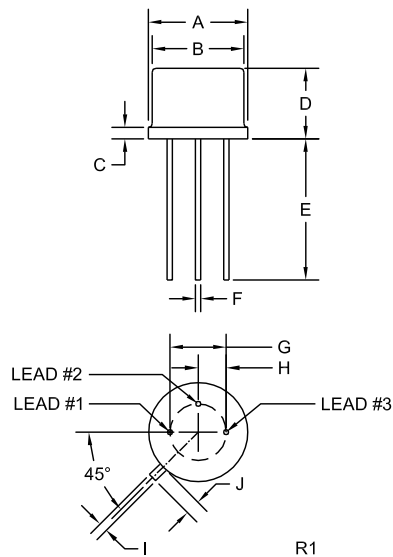
SYMBOL	TEST CONDITIONS	MIN	MAX	UNITS
I_{CBO}	$V_{CB}=60\text{V}$		10	nA
I_{EBO}	$V_{EB}=5.0\text{V}$		10	nA
BV_{CBO}	$I_C=100\mu\text{A}$	75		V
BV_{CER}	$I_C=10\text{mA}, R_{BE}=10\Omega$	50		V
BV_{EBO}	$I_E=100\mu\text{A}$	7.0		V
$V_{CE(SAT)}$	$I_C=150\text{mA}, I_B=15\text{mA}$		1.5	V
$V_{BE(SAT)}$	$I_C=150\text{mA}, I_B=15\text{mA}$		1.3	V
h_{FE}	$V_{CE}=10\text{V}, I_C=100\mu\text{A}$	20		
h_{FE}	$V_{CE}=10\text{V}, I_C=10\text{mA}$	35		
h_{FE}	$V_{CE}=10\text{V}, I_C=150\text{mA}$	40	120	
h_{FE}	$V_{CE}=10\text{V}, I_C=500\text{mA}$	20		
f_T	$V_{CE}=10\text{V}, I_C=50\text{mA}, f=20\text{MHz}$	60		MHz
C_{ob}	$V_{CB}=10\text{V}, I_E=0, f=100\text{kHz}$		25	pF
C_{ib}	$V_{EB}=0.5\text{V}, I_C=0, f=100\text{kHz}$		80	pF
N_F	$V_{CE}=10\text{V}, I_C=300\mu\text{A}, f=1.0\text{kHz}$		12	dB

R1 (23-April 2013)

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TO-39 CASE - MECHANICAL OUTLINE



DIMENSIONS				
SYMBOL	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A (DIA)	0.335	0.370	8.51	9.40
B (DIA)	0.315	0.335	8.00	8.51
C	-	0.040	-	1.02
D	0.240	0.260	6.10	6.60
E	0.500	-	12.70	-
F (DIA)	0.016	0.021	0.41	0.53
G (DIA)	0.200		5.08	
H	0.100		2.54	
I	0.028	0.034	0.71	0.86
J	0.029	0.045	0.74	1.14

TO-39 (REV: R1)

LEAD CODE:

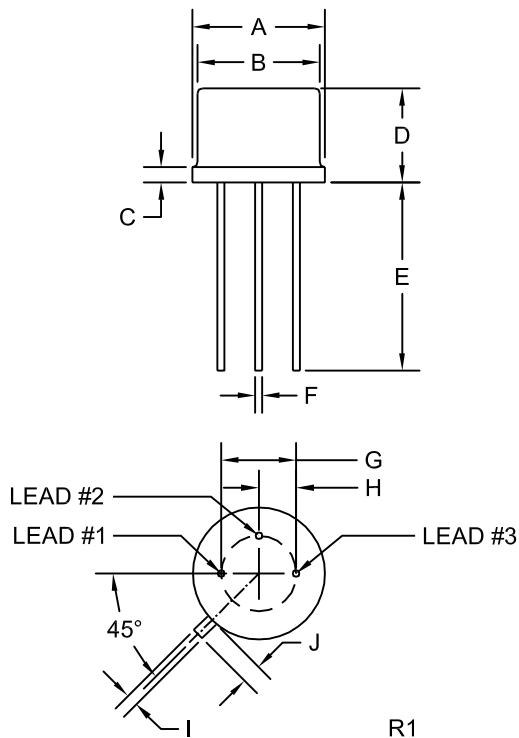
- 1) Emitter
- 2) Base
- 3) Collector

MARKING: FULL PART NUMBER

R1 (23-April 2013)

Package Details - TO-39

Mechanical Drawing



SYMBOL	DIMENSIONS			
	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A (DIA)	0.335	0.370	8.51	9.40
B (DIA)	0.315	0.335	8.00	8.51
C	-	0.040	-	1.02
D	0.240	0.260	6.10	6.60
E	0.500	-	12.70	-
F (DIA)	0.016	0.021	0.41	0.53
G (DIA)	0.200		5.08	
H	0.100		2.54	
I	0.028	0.034	0.71	0.86
J	0.029	0.045	0.74	1.14

TO-39 (REV: R1)

LEAD CODE:

TRIAC

- 1) MT1
- 2) GATE
- 3) MT2

SCR

- 1) CATHODE
- 2) GATE
- 3) ANODE

TRANSISTOR

- 1) EMITTER
- 2) BASE
- 3) COLLECTOR

Packing Code: D

D = White corrugated box with black conductive coating (surface resistivity of $<10^5$ ohms per square).

Standard Packing Quantity: 500

Material Composition Specification

TO-39 Case



Device average mass 1006 mg
 Fluctuation margin +/-10%

Component	Material	Material		Substance	CAS No.	Substance		
		(%wt)	(mg)			(%wt)	(mg)	(ppm)
active device	doped Si	0.497%	5.0	Si	7440-21-3	0.497%	5.0	4,970
bond wire	Al alloy	0.038%	0.39	Al	7429-90-5	0.038%	0.38	378
				Si	7440-21-3	0.001%	0.01	10
header	Kovar (Fe/Ni/Co alloy)	62.68%	630.61	Fe	7439-89-6	56.95%	572.87	569,453
				Ni	7440-02-0	2.531%	25.46	25,308
				Glass	Proprietary	1.491%	15	14,911
				Co	7440-48-4	1.143%	11.497	11,428
				Mn	7439-96-5	0.248%	2.492	2,477
				P	7723-14-0	0.085%	0.855	850
				Si	7440-21-3	0.073%	0.736	732
				Ag	7440-22-4	0.072%	0.72	716
				C	1333-86-4	0.05%	0.507	504
				Cu	7440-50-8	0.028%	0.28	278
				S	7704-34-9	0.015%	0.155	154
				N	7727-37-9	0.004%	0.038	38
can	metal alloy	34.79%	350	Fe	7439-89-6	34.67%	348.74	346,660
				Mn	7439-96-5	0.084%	0.85	845
				Al	7429-90-5	0.018%	0.18	179
				C	1333-86-4	0.016%	0.16	159
				S	7704-34-9	0.004%	0.04	40
can plating (inner layer)	nickel	1.06%	9.0	Ni	7440-02-0	1.06%	9.0	8,946
can plating (outer layer)	matte tin**	0.984%	9.9	Sn	7440-31-5	0.984%	9.9	9,841
lead free termination plating*	matte tin**	0.109%	1.1	Sn	7440-31-5	0.109%	1.1	1,093

*For Lead Free termination plating, add suffix "PB FREE" to part number.

**Contact the Central Semiconductor Sales Department for tin/lead plating availability.

Disclaimer

The information provided in this Material Composition data sheet is, to the best of our knowledge, correct. However, there is no guarantee to completeness or accuracy, as some information is derived from data sources outside the company.

R4 (16-July 2018)

Material Composition Specification

TO-39 Case



Device average mass 1006 mg
 Fluctuation margin +/-10%

Component	Material	Material		Substance	CAS No.	Substance		
		(%wt)	(mg)			(%wt)	(mg)	(ppm)
active device	doped Si	0.497%	5.0	Si	7440-21-3	0.497%	5.0	4,970
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R4 (16-July 2018)

OUTSTANDING SUPPORT AND SUPERIOR SERVICES



PRODUCT SUPPORT

Central's operations team provides the highest level of support to insure product is delivered on-time.

- Supply management (Customer portals)
- Inventory bonding
- Consolidated shipping options
- Custom bar coding for shipments
- Custom product packing

DESIGNER SUPPORT/SERVICES

Central's applications engineering team is ready to discuss your design challenges. Just ask.

- Free quick ship samples (2nd day air)
- Online technical data and parametric search
- SPICE models
- Custom electrical curves
- Environmental regulation compliance
- Customer specific screening
- Up-screening capabilities
- Special wafer diffusions
- PbSn plating options
- Package details
- Application notes
- Application and design sample kits
- Custom product and package development

REQUESTING PRODUCT PLATING

1. If requesting Tin/Lead plated devices, add the suffix "TIN/LEAD" to the part number when ordering (example: 2N2222A TIN/LEAD).
2. If requesting Lead (Pb) Free plated devices, add the suffix "PBFREE" to the part number when ordering (example: 2N2222A PBFREE).

CONTACT US

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